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Technical Report
FMA Report #TM-1-4-63-T
1 Apr 63

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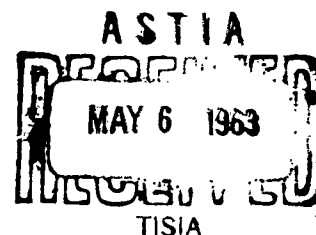
CATALOGED BY ASTIA

TELEMET COMPANY MODEL 1483-A17

VHF/FM TRANSMITTER

SPECTRUM UTILIZATION CHARACTERISTICS

PREPARED BY:



SYSTEMS ANALYSIS DIVISION
FREQUENCY MANAGEMENT ACTIVITY
U. S. ARMY SIGNAL RADIO PROPAGATION AGENCY
WHITE SANDS MISSILE RANGE
NEW MEXICO

Copy Number 22

FREQUENCY MANAGEMENT ACTIVITY
U. S. ARMY SIGNAL RADIO PROPAGATION AGENCY
White Sands Missile Range
New Mexico

In Reply Refer To
Director
ATTN: SIGRP-WS-SA

16 April 1963

SUBJECT: Letter of Transmittal

TO: See Distribution List

1. FMA Report #TM-1-4-63-T, "Telemet Company Model 1483-A17, VHF/FM Transmitter Spectrum Utilization Characteristics," dated 1 Apr 63, on FMA Proj Nr WS-05-5163051 is inclosed for your information and retention.
2. The views as contained therein have not been approved by the Department of the Army and represent only those of the issuing Agency.
3. Suggestions or criticism relative to the form, contents, purposes, or use of this publication should be referred to the Frequency Management Activity, U. S. Army Signal Radio Propagation Agency, ATTN: SIGRP-WS-SA, White Sands Missile Range, New Mexico.

1 Incl
as


JOHN C. COMPTON
Acting Director
Frequency Management Activity

TELEMET COMPANY MODEL 1483-A17
VHF/FM TRANSMITTER
SPECTRUM UTILIZATION CHARACTERISTICS

By
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APPROVED:



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Chief
Systems Analysis Division

1 Apr 63

FMA Report #TM-1-4-63-T

FREQUENCY MANAGEMENT ACTIVITY
U. S. ARMY SIGNAL RADIO PROPAGATION AGENCY
White Sands Missile Range
New Mexico

A B S T R A C T

The spectrum utilization characteristics of VHF/FM Transmitter, Telemet Model 1483-A17, were determined to facilitate the assignment of frequencies on an interference free basis. Operational characteristics were examined empirically against the parameters of operating time, supply voltage variations, and temperature. Interference characteristics (spurious emanations) were also examined.

The frequency stability met the requirements of $\pm 0.01\%$ (as required by WSMR Circular Nr 105-5) for all tests, except for the first two (2) minutes of the operating time test.

All antenna conducted spurious emanations met the requirements of 59 db down from f_0 (252.4 MCS), as specified in WSMR Circular Nr 105-5. (Required db down from $f_0 = 55 + 10 \log P_t$, where P_t is transmitted power in watts.)

There were five (5) spurious emanations, radiated, that exceeded the limits specified in MIL-I-26600, para 4.3.2.

It is recommended that the VHF/FM Transmitter, Telemet Model 1483-A17 be authorized for operational use at White Sands Missile Range provided that:

1. Careful testing of production models be incorporated to insure that units are tuned to the assigned frequency.

2. Primary voltages supplied to the unit do not exceed the limits to which the unit was subjected during the test.

A 508 KCS (± 254 KCS) channel bandwidth is recommended for interference free operation.

P R E F A C E

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I. I N T R O D U C T I O N

The electromagnetic spectrum is a limited resource and the demand for its use in the White Sands Missile Range and Fort Bliss Area has become excessive. As the required number of transmitters and receivers (both legitimate and inadvertent) increases, a detailed knowledge of their spectrum utilization and/or interference characteristics becomes mandatory. This information is necessary to the Area Frequency Coordinator so that he can intelligently assign frequencies to Range users and achieve efficient utilization of the electromagnetic spectrum with a minimum potential of mutual interference. This report concerns an empirical determination of these characteristics of the Telemet Company, Model 1483-A17, VHF/FM Transmitter.

The Telemet Model 1483-A17 Transmitter, primarily, is intended for telemetry applications. The transmitter is a crystal controlled-frequency modulated unit, which produces approximately 2.5 watts of power in the telemetry band.

This transmitter was proposed for use by the Sandia Corporation in the PERSHING Missile Project at White Sands Missile Range.

The transmitter (less power supplies and modulator) is approximately 4 1/8" long by 2 7/8" wide by 1 5/8" high.

All work as reported herein, has been conducted under authorized FMA Proj Nr WS-05-5163051.

II. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

1. The frequency stability met the requirements of $\pm 0.01\%$ (as required by WSMR Circular Nr 105-5) for all tests, except for the first two (2) minutes of the operating time test.

2. All antenna conducted spurious emanations met the requirements of 59 db down from f_o (252.4 MCS), as specified in WSMR Circular Nr 105-5. (Required db down from $f_o = 55 + 10 \log P_t$, where P_t is transmitted power in watts.)

3. There were five (5) spurious emanations, radiated, that exceeded the limits specified in MIL-I-26600, para 4.3.2.

B. RECOMMENDATIONS

1. That the VHF/FM Transmitter, Telemet Model 1483-A17 be authorized for operational use at White Sands Missile Range provided that:

a. Careful testing of production models be incorporated to insure that unit is tuned to the assigned frequency.

b. Primary voltages supply to the unit do not exceed the limits to which the unit was subjected during the test.

2. A 508 KCS (± 254 KCS) channel bandwidth is recommended for interference free operation.

III. S U M M A R Y

The total necessary bandwidth of the transmitter was calculated to be 508 KCS or 254 KCS. This value was determined as follows:

1. Spectrum Width:

2(Nominal deviation)	2(125 KCS)	250 KCS
2(Max Mod Freq)	2(70 KCS)	140 KCS

2. Frequency Accuracy With Respect to Assigned Frequency:

2(0.0135%)	(252.4 MCS) = 2(34 KCS)	68 KCS
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3. Safety Factor	2(25 KCS)	<u>50 KCS</u>
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Total	508 KCS
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or (254 KCS)

IV. SUMMARY OF RESULTS

Test T1 FREQUENCY STABILITY With Respect To:

a. Operating Time

The frequency decreased from ± 0.0135 to $\pm 0.0073\%$ of the assigned frequency (252.4 MCS), during 120 minutes of continuous operation. See Figure 1, page 9.

b. Supply Voltage

(1) The frequency increased from ± 0.0052 to $\pm 0.0071\%$ of the assigned frequency (252.4 MCS), as the filament supply voltage was decreased from 30 to 28 VDC. The plate voltage was held constant at 180 VDC.

(2) The frequency remained essentially constant ($\pm 0.0002\%$) at $\pm 0.0073\%$ of the assigned frequency (252.4 MCS), as the plate supply voltage was decreased from 181 to 179 VDC. The filament voltage was held constant at 28 VDC.

(3) The frequency increased from ± 0.0052 to $\pm 0.0069\%$ of the assigned frequency (252.4 MCS), as the plate supply voltage was decreased from 181 to 179 VDC and the filament supply voltage was decreased, simultaneously, from 30 to 28 VDC.

c. Temperature

The frequency decreased from ± 0.0086 to $\pm 0.0017\%$ of the assigned frequency (252.4 MCS), as the ambient temperature was increased from ± 30 to $\pm 120^\circ$ F. See Figure 2, page 10.

Test T2 POWER OUTPUT With Respect To:

a. Operating Time

The power output remained essentially constant ($\pm 2\%$) at nominal (2.65 watts), during 120 minutes of continuous operation.

b. Supply Voltage

(1) The power output remained essentially constant ($\pm 1\%$) at $\pm 1\%$ of the nominal (2.5 watts), as the filament supply voltage was decreased from 30 to 28 VDC. The plate voltage was held constant at 180 VDC.

(2) The power output remained essentially constant ($\pm 2\%$) of the nominal (2.5 watts), as the plate supply voltage was decreased from 181 to 179 VDC. The filament voltage was held constant at 28 VDC.

(3) The power output decreased from ± 4 to -2% of the nominal (2.5 watts), as the plate supply voltage was decreased from 181 to 179 VDC and the filament supply voltage was decreased, simultaneously, from 30 to 28 VDC.

c. Temperature

The power output decreased from ± 2 to -12% of the nominal (2.5 watts), as the ambient temperature was increased from ± 30 to $\pm 120^\circ$ F. See Figure 3, page 11.

Test T3 CONDUCTED INTERFERENCE (Input Power Leads)

All spurious emanations, in the frequency range from 150 KCS to 25 MCS, on both the filament and plate leads, met the requirements of MIL-I-26600, para 4.3.1.

Test T4 RADIATED INTERFERENCE (150 KCS to 10 KMCS)

There were five (5) spurious emanations that exceeded the limits specified in MIL-I-26600. See Table I, page 12.

Test T5 ANTENNA CONDUCTED SPURIOUS EMANATIONS (150 KCS to 10 KMCS)

All antenna conducted spurious emanations met the requirements of 59 db down from f_0 as specified in WSMR Circular Nr 105-5. (Required db down from $f_0 = 55 + 10 \log P_t$, where P_t is transmitted power in watts.) See Table II, page 13.

Test T7 MODULATION CHARACTERISTICS (Deviation) With Respect To:

a. Operating Time

The deviation remained essentially constant ($\pm 1\%$) at nominal (90 KCS), during 120 minutes of continuous operation.

b. Supply Voltage

(1) The deviation remained essentially constant ($\pm 1\%$) at nominal (89 KCS), as the filament supply voltage was decreased from 30 to 28 VDC. The plate voltage was held constant at 180 VDC.

(2) The deviation remained essentially constant ($\pm 1\%$) at nominal (89 KCS), as the plate supply voltage was decreased from 181 to 171 VDC. The filament voltage was held constant at 28 VDC.

(3) The deviation remained essentially constant ($\pm 1\%$) at nominal (89 KCS), as the plate supply voltage was decreased from 181 to 179 VDC, and the filament supply voltage was decreased, simultaneously, from 30 to 28 VDC.

c. Temperature

The deviation remained essentially constant ($\pm 1\%$) at nominal (90 KCS), as the ambient temperature was increased from ± 30 to $\pm 120^\circ$ F.

q. Modulation Voltage

The deviation decreased from ± 78 to -89% of the nominal (90 KCS), as the modulation voltage was decreased from 1.58 to 0.091 Vrms. See Figure 4, page 14.

r. Modulation Frequency

The deviation varied between ± 4 and -9% of the nominal (90 KCS), as the modulation frequency was varied from 0.400 to 70 KCS. The modulation input voltage was held constant at 0.79 Vrms. See Figure 5, page 15.

V. EXPERIMENTAL DATA

Supporting data for the following tests are given:

Test	Figure	Table	Page
T1a - - - - -	1 - - - - -		9
T1c - - - - -	2 - - - - -		10
T2c - - - - -	3 - - - - -		11
T4 - - - - -		I - - - - -	12
T5 - - - - -		II - - - - -	13
T7q - - - - -	4 - - - - -		14
T7r - - - - -	5 - - - - -		15

TEST Tla - - - FREQUENCY STABILITY

Relative Frequency With Respect to Operating Time

- NOTES:
1. Assigned Frequency: 252.4 MCS = 0%
 2. Transmitter was mounted on a 12" x 12" x 3/16" aluminum plate, for heat dissipation.
 3. No forced air cooling.
 4. Modulation input grounded.
 5. The filaments were turned on 30 seconds before the plate was turned on.

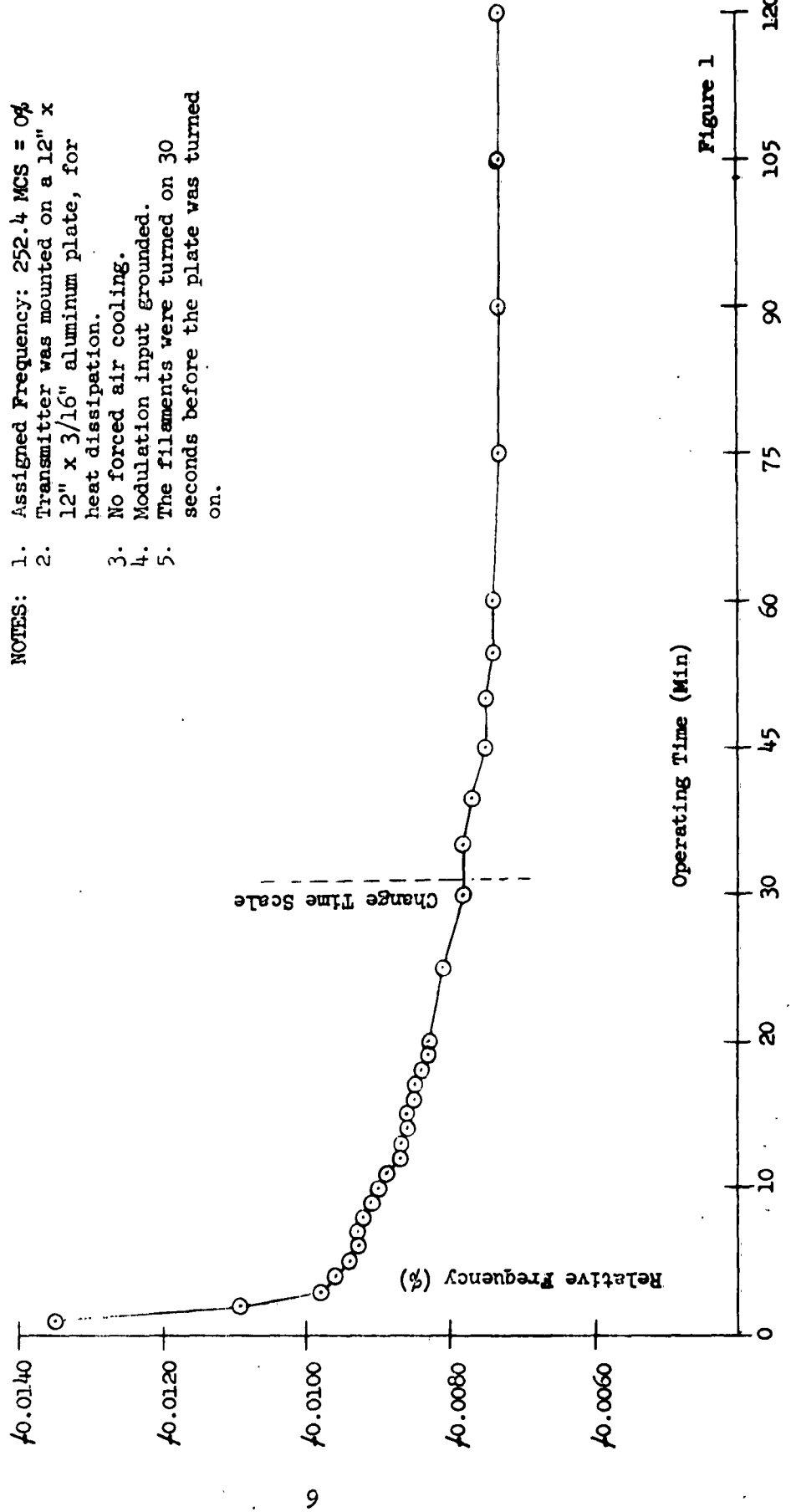


Figure 1

TEST Etc - - - FREQUENCY STABILITY

Relative Frequency With Respect to Temperature

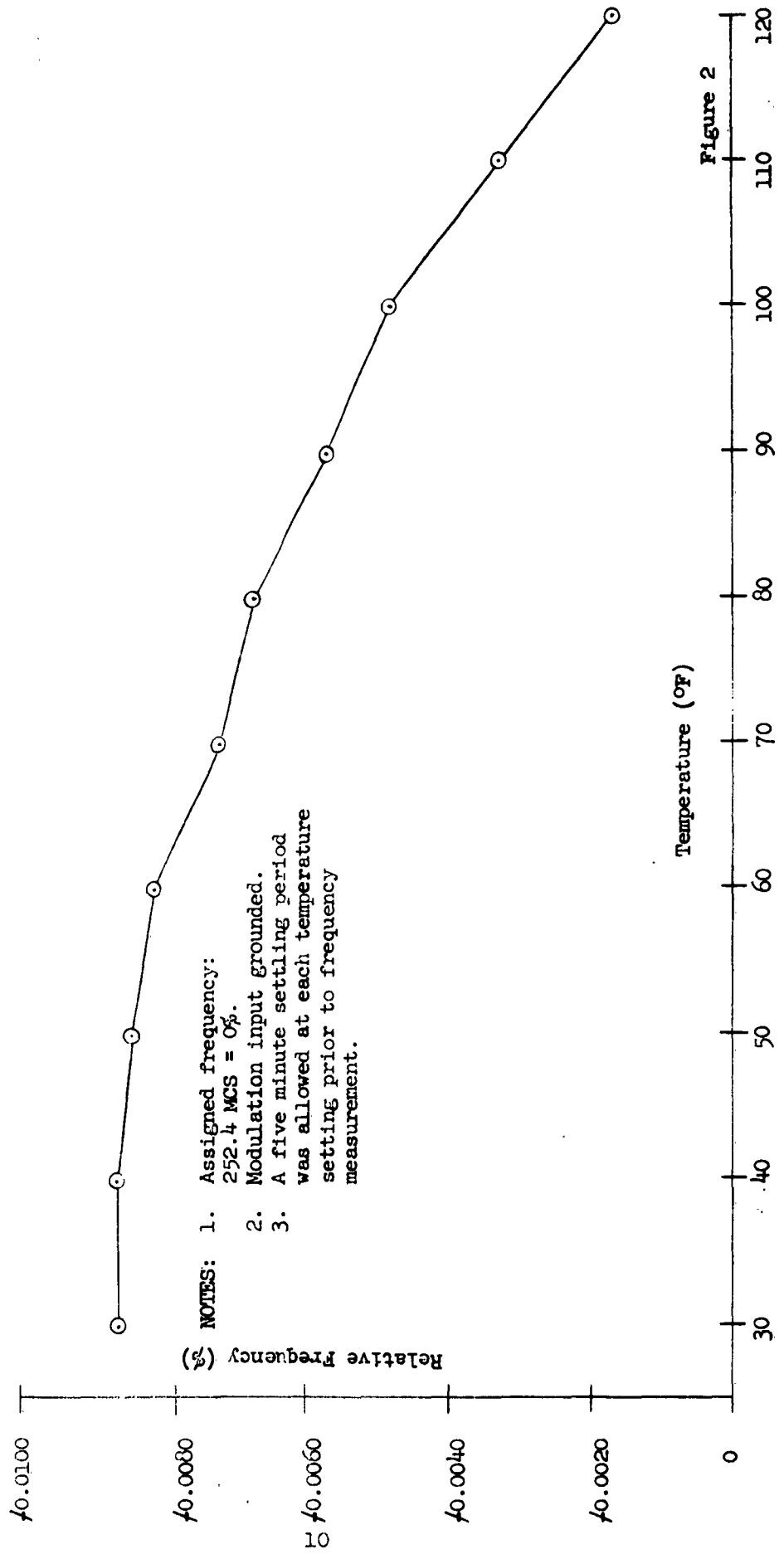


Figure 2

TEST T2c - - - POWER OUTPUT

Relative Power Output With Respect to Temperature

- NOTES: 1. $0\% = 2.5$ Watts.
2. A five minute settling period was allowed at each temperature setting prior to power measurement.

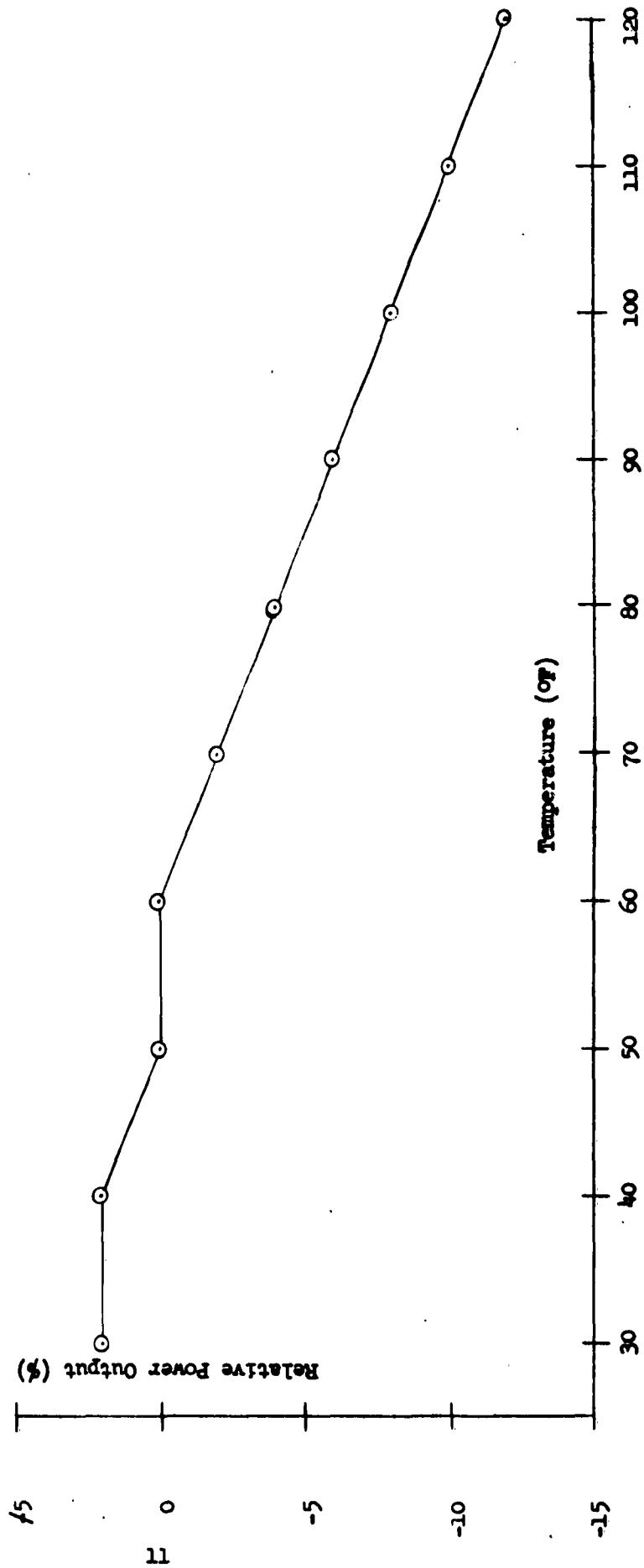


Figure 3

TABLE I

T-4 RADIATED EMANATIONS (0.150 to 10,000 MCS)

There were five (5) spurious emanations that exceeded the limits specified in MIL-I-26600.

FREQUENCY (MCS)	NOMENCLATURE	db/1uV ANTENNA INDUCED	
		MEASURED LEVEL	MIL-I-26600 LIMITS
31.5532	Xtal Osc	25	16
126.2120	4th Multiple of Xtal Osc	45	28
252.4242	Fundamental (f_o)	82	32
504.8484	2nd Harmonic of f_o	50	36
757.2744	3rd Harmonic of f_o	46	39

TABLE II

T-5 ANTENNA CONDUCTED SPURIOUS EMANATIONS (0.150 to 10,000 MCS)

All antenna conducted spurious emanations met the requirements of 59 db down from f_o (252.4 MCS), as specified in WSMR Circular Nr 105-5. (Required db down from $f_o = 55 + 10 \log P_t$, where P_t is transmitted power in watts.)

There were eleven (11) antenna conducted spurious emanations that did not meet the requirements of 84 db down from f_o , as specified in MIL-I-26600. (Required db down from $f_o = 80 + 10 \log P_t$, where P_t is transmitted power in watts.)

FREQUENCY (MCS)	NOMENCLATURE	EMANATION LEVEL	
		dbm	db down from f_o
126.2103	4th Multiple of Xtal Osc	-35	69
189.3154	6th Multiple of Xtal Osc	-39	73
220.8684	7th Multiple of Xtal Osc	-31	65
252.4216	Fundamental (f_o)	-34	0
283.9738	9th Multiple of Xtal Osc	-33	67
315.5262	10th Multiple of Xtal Osc	-42	76
378.6315	12th Multiple of Xtal Osc	-45	79
504.8420	2nd Harmonic of f_o	-30	64
1009.6910	4th Harmonic of f_o	-43	77
1262.1110	5th Harmonic of f_o	-40	74
2271.7968	9th Harmonic of f_o	-43	77
2524.2195	10th Harmonic of f_o	-33	67

TEST T7q - - - MODULATION CHARACTERISTICS

Relative Deviation With Respect to Modulation Voltage

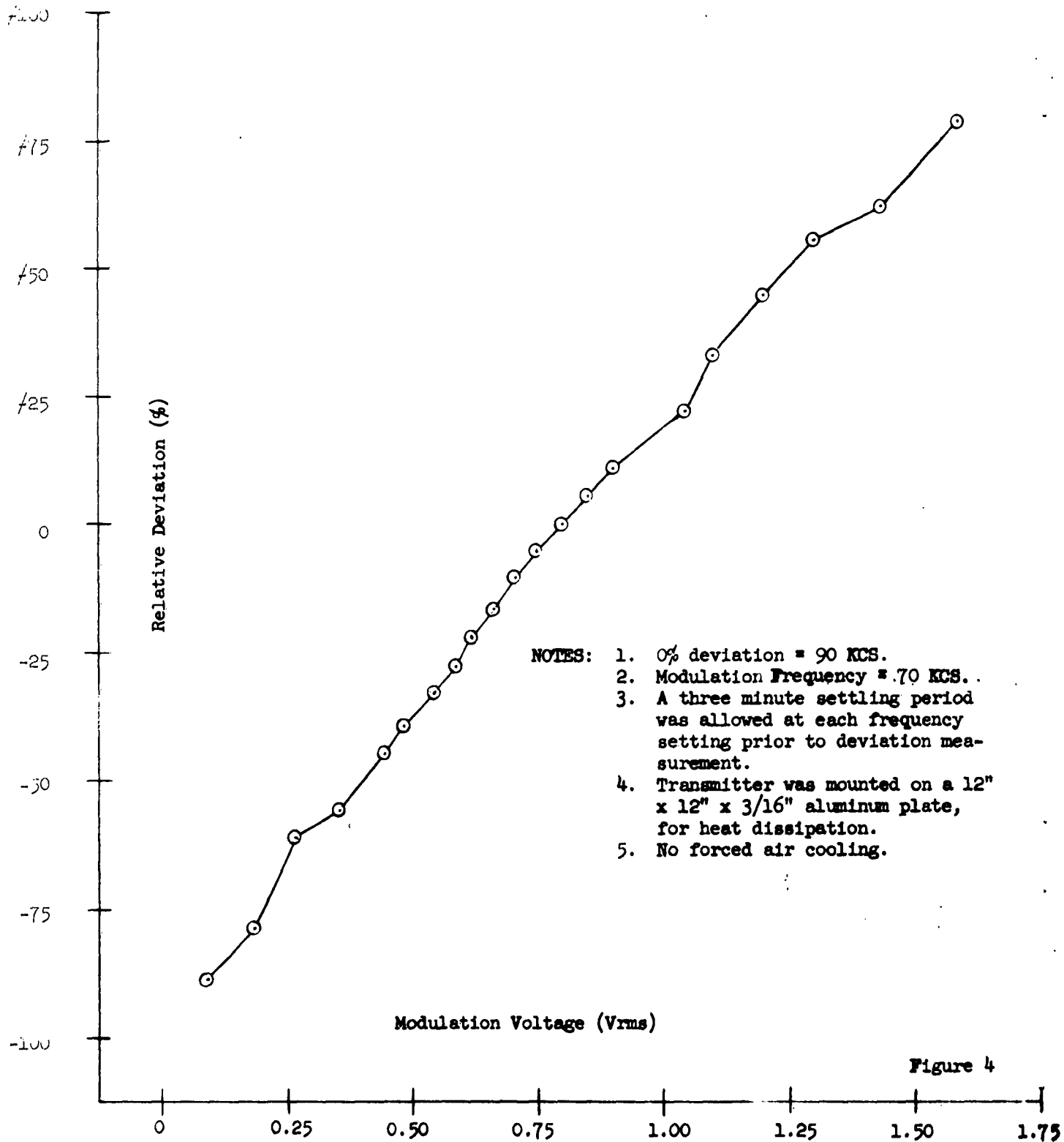


Figure 4

TEST 17F - - - MODULATION CHARACTERISTICS
Relative Deviation With Respect to Modulation Frequency

- NOTES:
1. 0% deviation = 90 KHZ.
 2. Modulation Voltage: 0.79 Vrms.
 3. A three minute settling period was allowed at each frequency setting prior to deviation measurement.
 4. Transmitter was mounted on a 12" x 12" x 3/16" aluminum plate, for best dissipation.
 5. No forced air cooling.

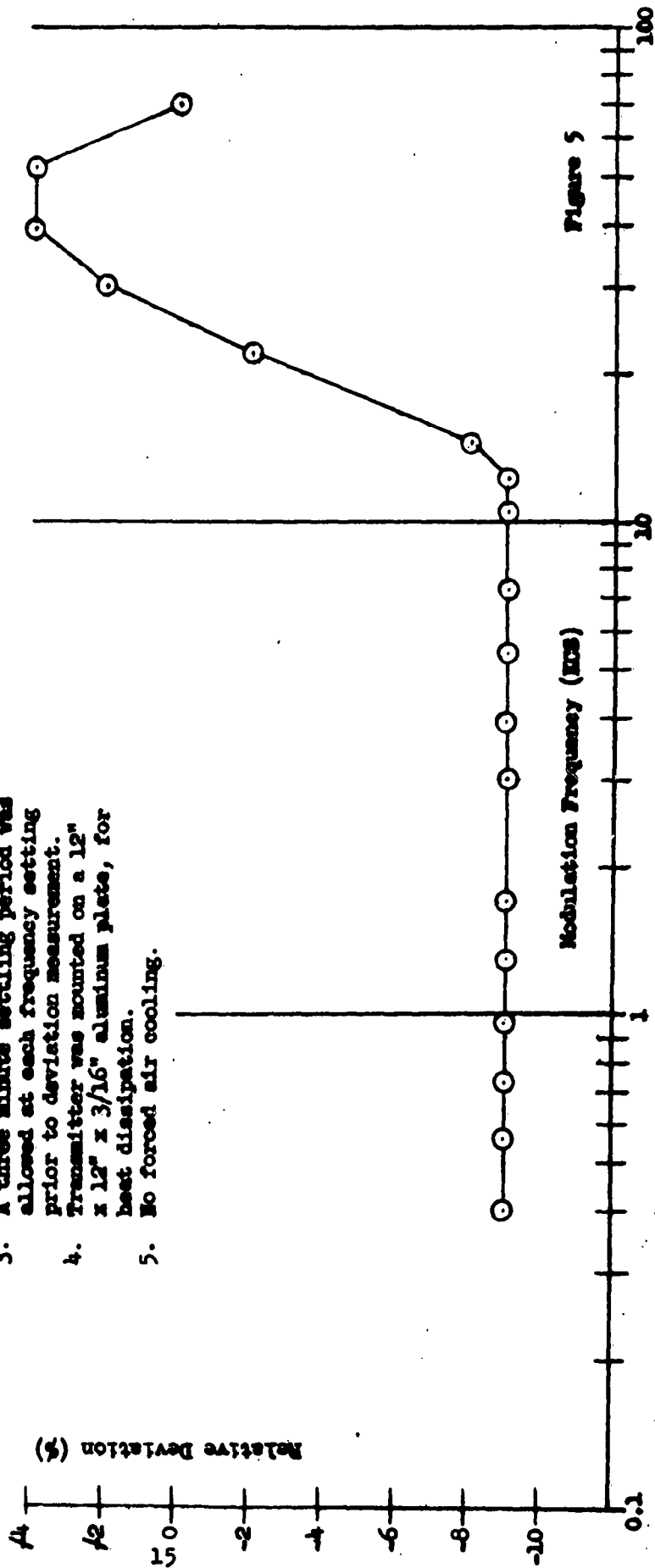


Figure 5

A P P E N D I X A

DEFINITIONS AND MEASUREMENT TECHNIQUES

1. General Operation

The transmitter was mounted on a 12" x 12" x 3/16" aluminum plate for heat dissipation. Forced air cooling was applied for all tests, except for the operating time and voltage variations tests, where case temperatures were prime factors in data. Cooling was approximately 500 CFM at 20° C and 30% relative humidity air.

2. Frequency Stability

Transmitter frequency stability measurements were taken with a combination of the Hewlett-Packard Model 540A transfer oscillator and Hewlett-Packard 524B electronic counter with Hewlett-Packard Model 525B frequency converter unit. The accuracy of measurements was $\pm 0.0001\%$. See Connection Diagram 1, page 19.

3. Power Output

Power output was measured with the Hewlett-Packard Model 434A calorimetric power meter. Accuracy of measurements was $\pm 5\%$ absolute; $\pm 1\%$ relative. See Connection Diagram 1, page 19.

4. Modulation Characteristics

Deviation was measured with the Marconi Model TF-928 deviation meter. The accuracy of measurements was $\pm 3\%$ absolute; $\pm 1\%$ relative. See Connection Diagram 1, page 19.

5. Conducted Interference (Input Power Leads)

Conducted interference were any emanations present (narrow or broadband) in the supply voltage leads within the frequency range from 0.150 to 25 MCS. Measurements were made using noise and field intensity meter, Empire Devices Corp., Model NF-105 with a lab built stabilization network used as the pickup device. Tests were conducted according to the test procedures of MIL-I-26600. See Connection Diagram 2, page 20.

6. Radiated Interference

Radiated interference were any emanations radiated from the transmitter case when the antenna output was properly terminated into a non-radiating load. Tests were conducted according to the test procedures of MIL-I-26600. See Connection Diagrams 3, 4, and 5, pages 21, 22, and 23.

7. Antenna Conducted Spurious Emanations (0.15 to 10,000 MCS)

Antenna conducted spurious emanations were any spurious emanations from the RF output of the transmitter, expressed in db below the power level at the fundamental operating frequency (f_o). Spurious emanations were checked by tuning the receiver through the frequency range (100 MCS to 4 KMCS). When a response was observed, a wavetrap was inserted temporarily in the circuit to distinguish between actual spurious emissions of the transmitter and spurious responses of the receiver. A signal generator was then tuned to the frequency of the spurious emission by obtaining a zero beat audible in the receiver's audio output. The frequency of the generator was then measured with the Hewlett-Packard transfer oscillator and the Hewlett-Packard electronic counter. The signal generator was then substituted for the transmitter and the output level of the signal generator was adjusted, by means of the General Radio adjustable attenuator, for the same amplitude as the transmitter emission, as indicated by the meter deflection of the receiver. The difference in attenuator settings was combined with the signal generator's output level to calculate the emission amplitude.

The levels of spurious emissions from 4 to 10 KMCS were measured in the same manner except that the signal generator attenuator was used in place of the General Radio adjustable attenuator. See Connection Diagram 7, page 25.

Spurious emissions within the frequency range 0.150 to 100 MCS were measured in a similar manner except that the General Radio adjustable attenuator was removed and two Empire Devices fixed attenuators were substituted. The signal generator attenuator was used to measure the spurious emission amplitude by the substitution method. See Connection Diagram 6, page 24.

Additional attenuators were used as required. Low pass filters were inserted temporarily to distinguish between actual spurious emissions of the transmitter under test and spurious responses of the receiver.

A P P E N D I X B

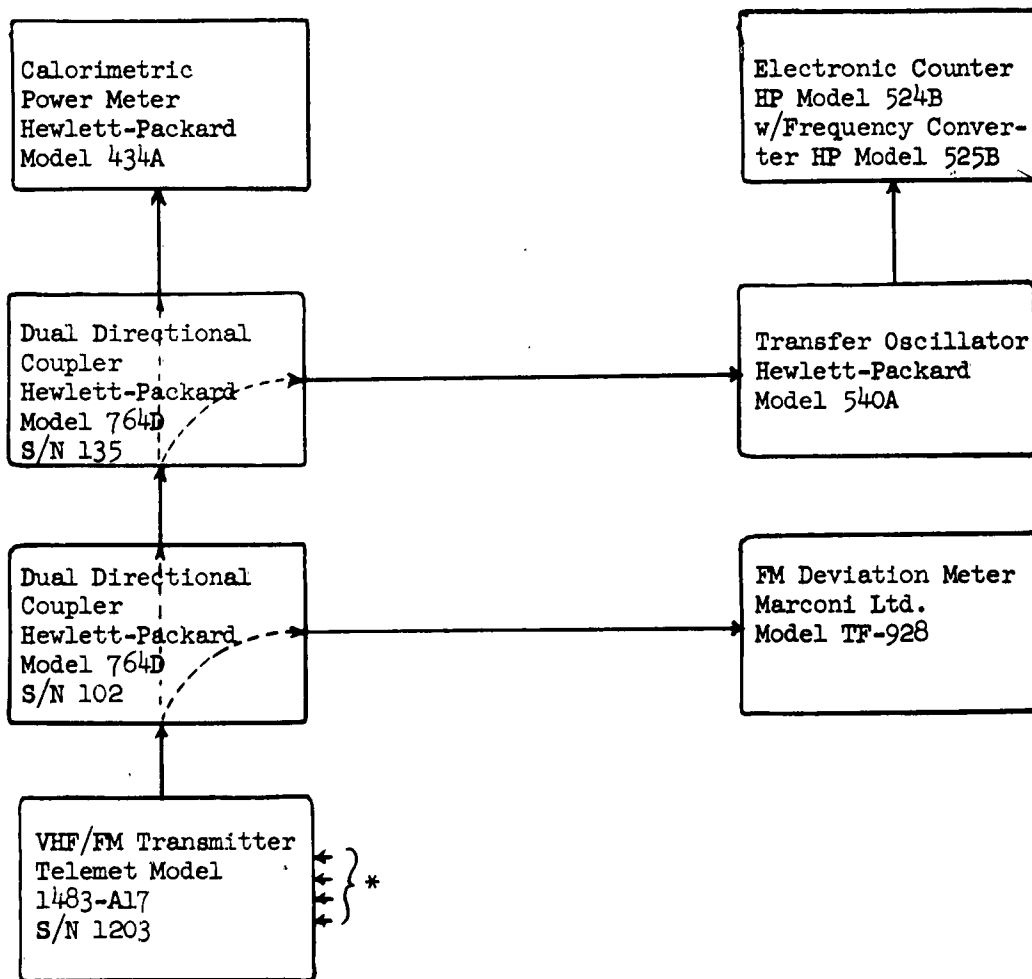
CONNECTION DIAGRAMS

Connection Diagrams for the following tests are given:

Test	Connection Diagram	Page
T1a - - - - -	1 - - - - -	19
T1b - - - - -	1 - - - - -	19
T1c - - - - -	1 - - - - -	19
T2a - - - - -	1 - - - - -	19
T2b - - - - -	1 - - - - -	19
T2c - - - - -	1 - - - - -	19
T3 - - - - -	2 - - - - -	20
T4 - - - - -	3, 4, and 5 - - - - -	21, 22, 23
T5 - - - - -	6 and 7 - - - - -	24, 25
T7a - - - - -	1 - - - - -	19
T7b - - - - -	1 - - - - -	19
T7c - - - - -	1 - - - - -	19
T7q - - - - -	1 - - - - -	19
T7r - - - - -	1 - - - - -	19
Power Supply, Voltage Monitoring and Modulation Input Systems - - - - -	8 - - - - -	26

CONNECTION DIAGRAM 1

Used in Tests T1a, T1b, T1c, T2a, T2b, T2c, T7a, T7b, T7c, T7q and T7r

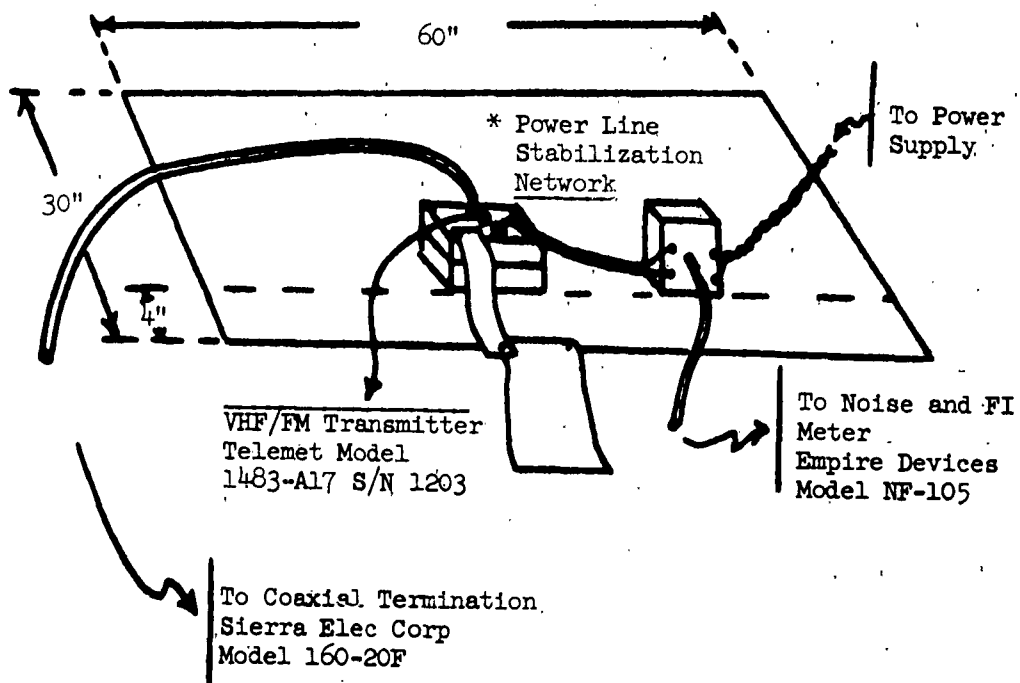


NOTE: For Tests T1c, T2c, and T7c, the transmitter was placed in temperature test chamber, Delta Design Engineers, Model 1060S.

* See Connection Diagram 8, page 26, for power supply, voltage monitoring, and modulation input systems.

CONNECTION DIAGRAM 2

Used in Test T-3

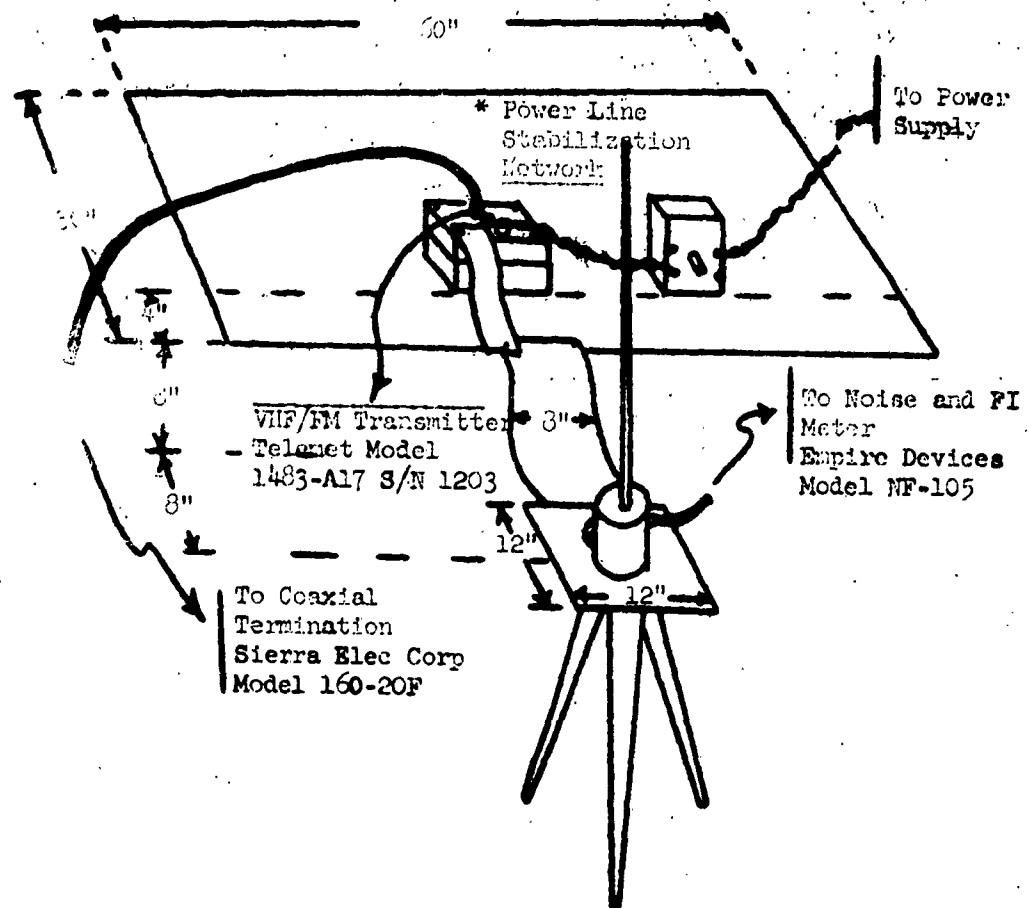


* Two stabilization networks were used with this unit,
(filament and plate leads).

CONNECTION DIAGRAM 3

Used in Test T-4 (0.150 to 25 MCS)

Rod Antenna

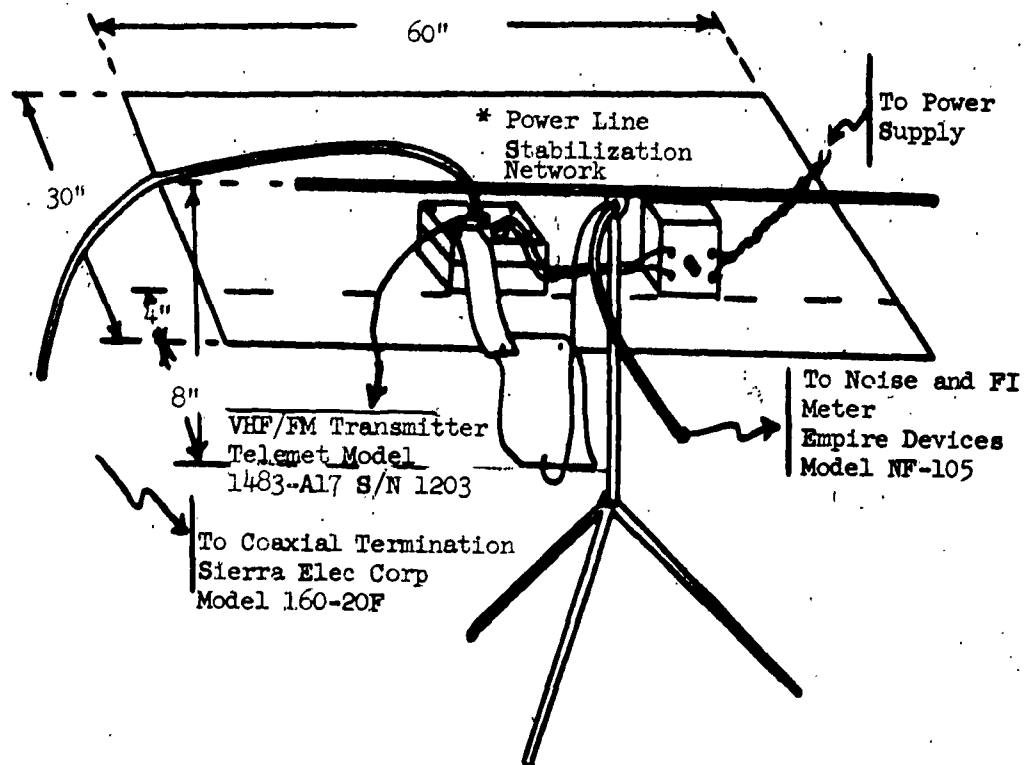


* Two stabilization networks were used with this unit, (filament and plate leads).

CONNECTION DIAGRAM 4

Used in Test T-4 (25 - 1000 MCS)

Dipole Antenna

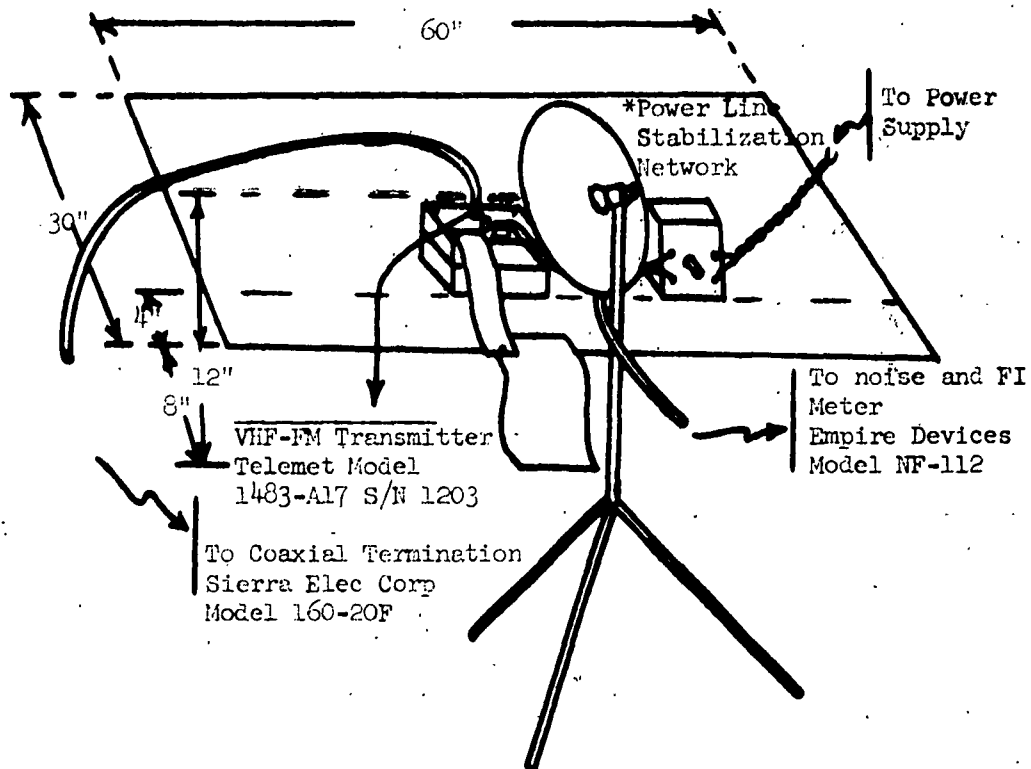


* Two stabilization networks were used with this unit,
(filament and plate leads).

CONNECTION DIAGRAM 5

Used in Test T-4 (1 to 10 MCS)

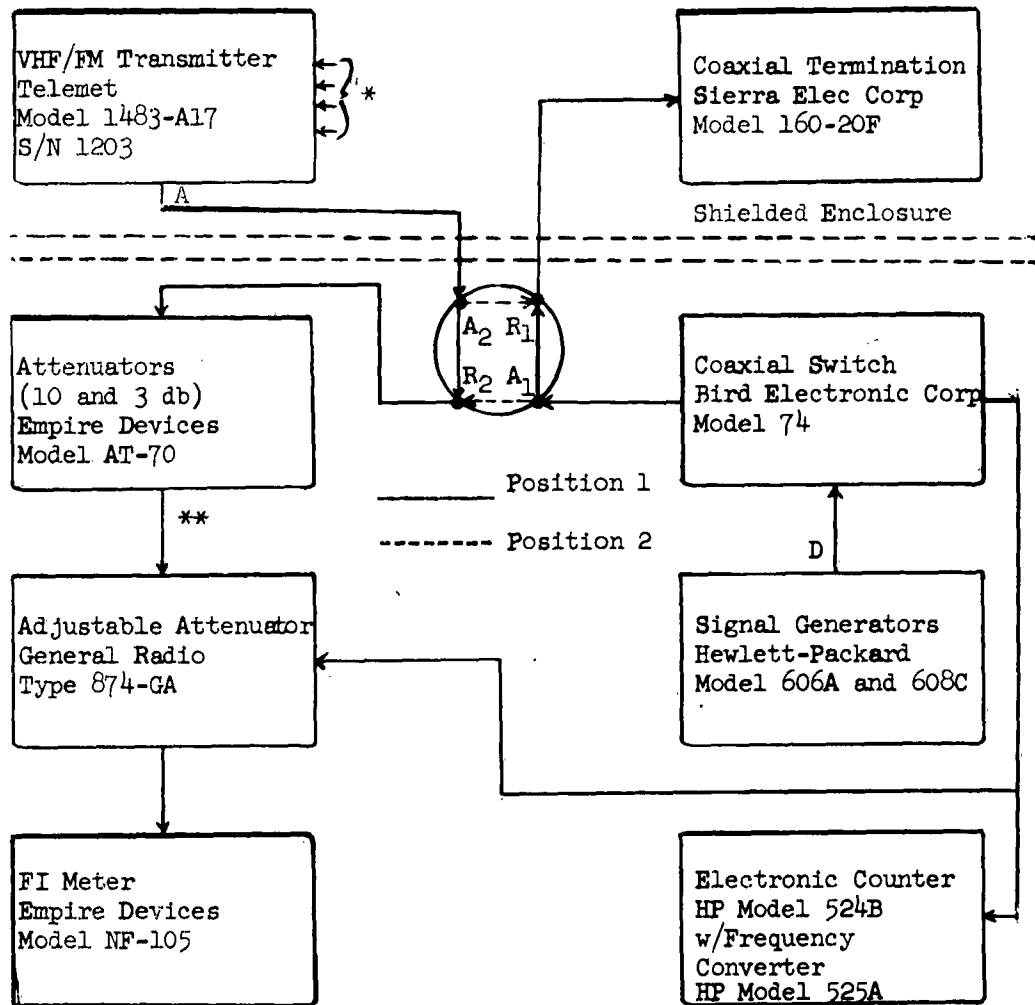
Pyramidal Antenna



*. Two stabilization networks were used with this unit,
(filament and plate leads).

CONNECTION DIAGRAM 6

Used in Test T-5 (150 KCS to 100 MCS)



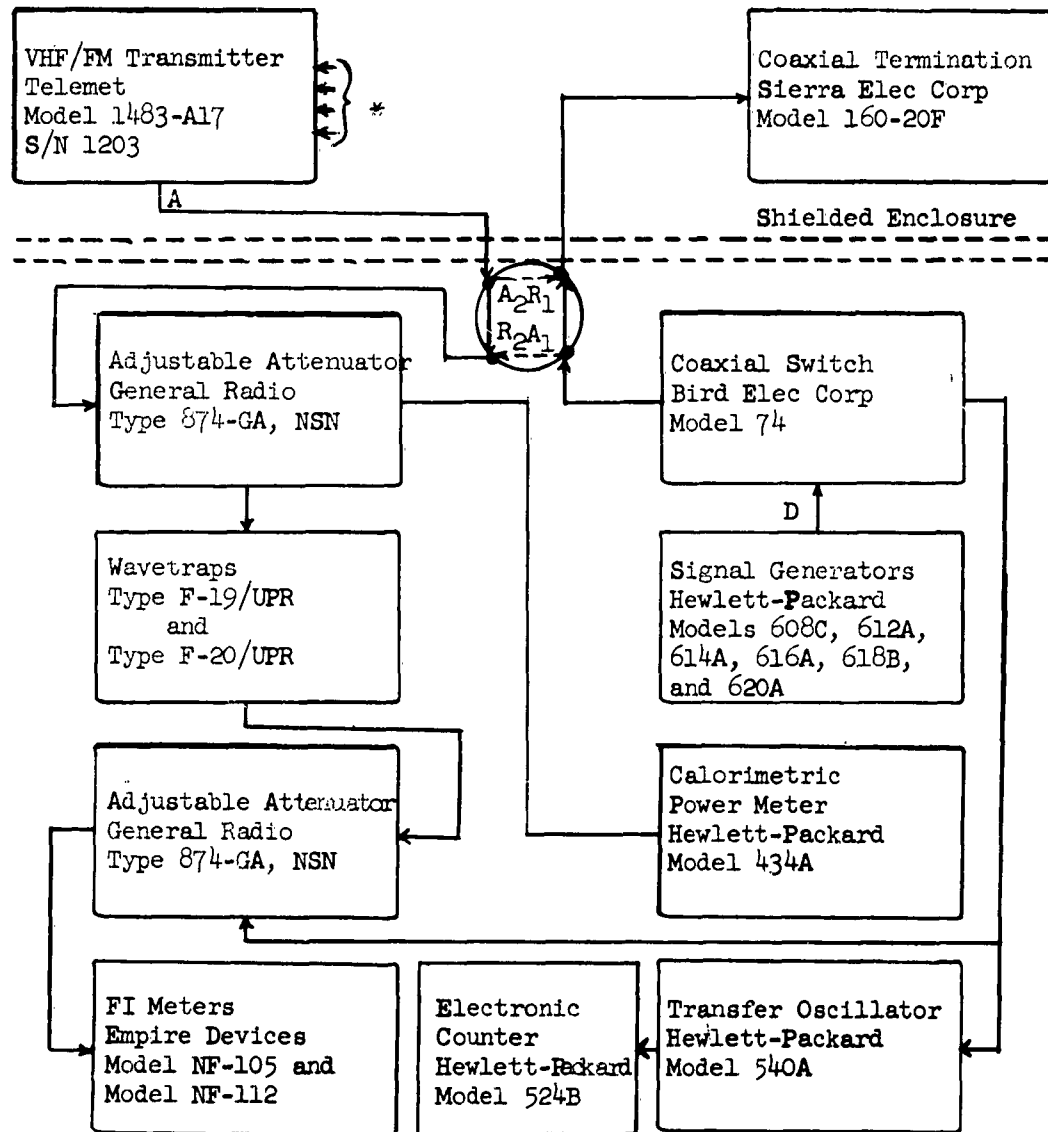
A to A_2 = A_1 to D in cable length and loss.

* See Connection Diagram 8, page 26, for power supply, voltage monitoring, and modulation input systems.

** Additional attenuators and/or filters, as required, were inserted here.

CONNECTION DIAGRAM 7

Used in Test T-5 (100 MCS to 10 KMCS)



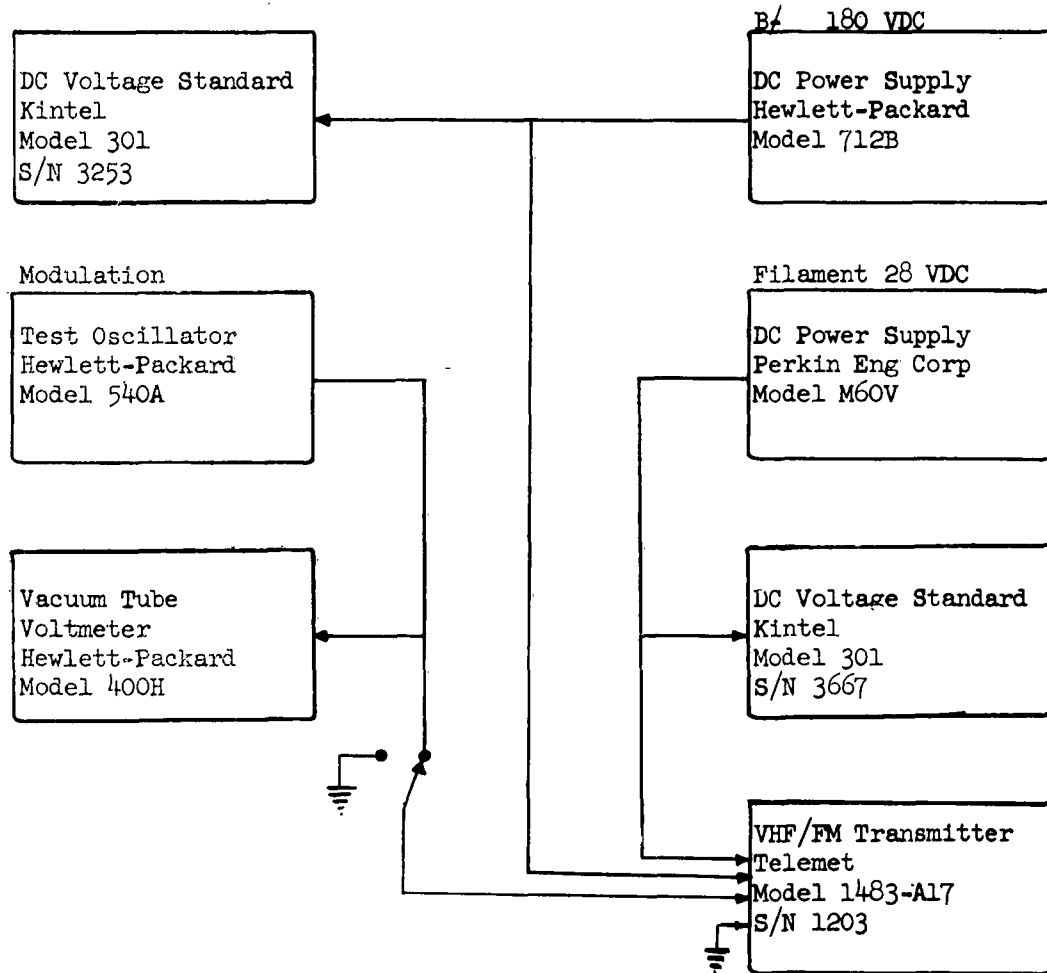
A to A2 = A1 to D in cable length and loss.

* See Connection Diagram 8, page 26, for power supply, voltage monitoring and modulation input systems.

CONNECTION DIAGRAM 8

Power Supply, Voltage Monitoring, and Modulation Input Systems

Used in All Tests



A P P E N D I X C

EQUIPMENT TESTED AND TEST APPARATUS

1. Equipment Tested:

VHF/FM Transmitter, Telemet Co., Model 1483-A17, S/N 1203

2. Test Apparatus:

- a. Signal Generator, Hewlett-Packard, Model 606A, S/N 038-03070.
- b. Signal Generator, Hewlett-Packard, Model 608C, S/N 202-04129.
- c. Signal Generator, Hewlett-Packard, Model 612A, S/N 004-02247.
- d. Signal Generator, Hewlett-Packard, Model 614A, S/N 394.
- e. Signal Generator, Hewlett-Packard, Model 616A, S/N 1482.
- f. Signal Generator, Hewlett-Packard, Model 618B, S/N 64.
- g. Signal Generator, Hewlett-Packard, Model 620A, S/N 216-02574.
- h. Test Oscillator, Hewlett-Packard, Model 650A, S/N 3101.
- i. Calorimetric Power Meter, Hewlett-Packard, Model 434A, S/N 197.
- j. Transfer Oscillator, Hewlett-Packard, Model 540A, S/N 1137.
- k. Electronic Counter, Hewlett-Packard, Model 524B, S/N 61.
- l. Frequency Converter Unit, Hewlett-Packard, Model 525A, S/N 150.
- m. Frequency Converter Unit, Hewlett-Packard, Model 525B, S/N 2216.
- n. Noise and Field Intensity Meter, Empire Devices, Model NF-105, S/N 1030.
- o. Noise and Field Intensity Meter, Empire Devices, Model NF-112, S/N 260.
- p. FM Deviation Meter, Marconi Inst. Ltd., Type TF-928, S/N 509304.
- q. DC Power Supply, Hewlett-Packard, Model 712B, S/N 3589.
- r. DC Power Supply, Perkin Eng. Corp., Model M60V, S/N 5903.

- s. Vacuum Tube Voltmeter, Hewlett-Packard, Model 400H,
S/N 116-17141.
- t. DC Voltage Standard, Kintel, Model 301 (2), S/N 3253
and 3667.
- u. Coaxial Termination, Sierra Electronic Corp., Model 160-20F,
S/N 162.
- v. Condenser Wavetrap, Hudson American Corp., Type F-19/UPR,
S/N 780.
- w. Stub Wavetrap, Designers for Industry Inc., Type F-20/UPR,
S/N 772.
- x. Stabilization Network, Lab Built, (2), NSN.
- y. Dual Directional Coupler, Hewlett-Packard, Model 764D (2),
S/N 102 and 135.
- z. Adjustable Attenuator, General Radio Co., Type 874-GA (2),
NSN.
- a'. Coaxial Switch, Bird Electronics, Model 74, NSN.
- b'. Coaxial Switch, Bird Electronics, Model 72R, NSN.
- c'. Attenuator, Empire Devices, Model AT-70 3DB, NSN.
- d'. Attenuator, Empire Devices, Model AT-70 10DB, NSN.
- e'. Temperature Test Chamber, Delta Design Engineers, Model 1060S,
S/N 1138.

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ATTN: SIGRP-WS-SAE	12 & 13
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ATTN: SIGRP-WS-FE	15
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<p>AD ACCESSION NO.</p> <p>Frequency Management Activity, U. S. Army Signal Radio Propagation Agency, White Sands Missile Range, New Mexico</p> <p>TELETYPE CIPHERTEXT MODEL 1483-A17 VHF/PM TRANSMITTERS SPECTRUM UTILIZATION CHARACTERISTICS, by Virgilio Cisneros, Evaluation Rept., PMA Proj Nr 48-05-516599 dated 1 Apr 63, 39 p. Incl illus tables (PMA Report #MA-1-4-63-4.) Unclassified report</p> <p>Spectrum utilization characteristics of Telemet Model 1483-A17, VHF/PM Transmitter were determined to facilitate the assignment of frequencies on an interference free basis. The frequency stability met the requirements of 40.025 (as required by WMA Circular Nr 105-5) for all tests, except for the first two minutes of the operating time test. All antennas conducted spurious emissions met the requirements of 59 db down from f_c. It is recommended that this transmitter be authorized for operational use at White Sands Missile Range. A 508 KHz (454 KHz) channel bandwidth is recommended for interference free operation.</p> <p>UNCLASSIFIED</p> <ol style="list-style-type: none"> 1. Aircraft and Flight Equipment 2. Communications 3. Electronics and Electronic Equipment 4. Guided Missiles <p>DISTRIBUTION: U. S. Military organizations request copies from Originator or AETL. Others submit requests through transmitting agents to Originator.</p> <p>Director Frequency Management Activity U. S. Army Signal Radio Propagation Agency ATTN: S1002-48-4A White Sands Missile Range New Mexico</p>	<p>AD ACCESSION NO.</p> <p>Frequency Management Activity, U. S. Army Signal Radio Propagation Agency, White Sands Missile Range, New Mexico</p> <p>TELETYPE CIPHERTEXT MODEL 1483-A17 VHF/PM TRANSMITTERS SPECTRUM UTILIZATION CHARACTERISTICS, by Virgilio Cisneros, Evaluation Rept., PMA Proj Nr 48-05-516599 dated 1 Apr 63, 39 p. Incl illus tables (PMA Report #MA-1-4-63-4.) Unclassified report</p> <p>Spectrum utilization characteristics of Telemet Model 1483-A17, VHF/PM Transmitter were determined to facilitate the assignment of frequencies on an interference free basis. The frequency stability met the requirements of 40.025 (as required by WMA Circular Nr 105-5) for all tests, except for the first two minutes of the operating time test. All antennas conducted spurious emissions met the requirements of 59 db down from f_c. It is recommended that this transmitter be authorized for operational use at White Sands Missile Range. A 508 KHz (454 KHz) channel bandwidth is recommended for interference free operation.</p> <p>UNCLASSIFIED</p> <ol style="list-style-type: none"> 1. Aircraft and Flight Equipment 2. Communications 3. Electronics and Electronic Equipment 4. Guided Missiles <p>DISTRIBUTION: U. S. Military organizations request copies from Originator or AETL. Others submit requests through transmitting agents to Originator.</p> <p>Director Frequency Management Activity U. S. Army Signal Radio Propagation Agency ATTN: S1002-48-4A White Sands Missile Range New Mexico</p>	<p>UNCLASSIFIED</p> <ol style="list-style-type: none"> 1. Aircraft and Flight Equipment 2. Communications 3. Electronics and Electronic Equipment 4. Guided Missiles <p>DISTRIBUTION: U. S. Military organizations request copies from Originator or AETL. Others submit requests through transmitting agents to Originator.</p> <p>Director Frequency Management Activity U. S. Army Signal Radio Propagation Agency ATTN: S1002-48-4A White Sands Missile Range New Mexico</p>
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